

CLAIMS

What is claimed is:

1 1. An electronic ballast comprising:
2 an input rectifier circuit for rectifying an input voltage;
3 a voltage inverter circuit for receiving a rectified input voltage from said
4 input rectifier circuit, and for providing voltage/current to a
5 discharge lamp for providing a dimmable light;
6 a controller for controlling the operation of the voltage inverter circuit;
7 and
8 a keep-alive feedback circuit for feeding back energy from said
9 discharge lamp to said voltage inverter circuit to allow a high
10 dimming operation.

1 2. The ballast of claim 1, wherein said keep-alive feedback circuit
2 utilizes a capacitor for said feeding back energy.

1 3. The ballast of claim 1, wherein
2 said input rectifier comprises a plurality of diodes, and further wherein
3 said keep-alive feedback circuit comprises a capacitor connected to
4 both said rectifier circuit and the discharge lamp for ensuring
5 that at least one of said plurality of diodes is always conducting.

1 4. The ballast of claim 1 further comprising:
2 a constant voltage supply circuit connected to said rectifier circuit and
3 for supplying a substantially constant voltage to said controller,
4 wherein
5 said constant voltage supply circuit uses a voltage of the discharge
6 lamp to provide said substantially constant voltage when the
7 input current is low due to the high dimming operation.

1 5. The ballast of claim 1, wherein said input rectifier circuit
2 includes:
3 a plurality of diodes operating at a frequency above the frequency of
4 the input voltage, wherein at any given time at least one diode is
5 in a conducting mode due to said keep-alive feedback circuit.

1 6. The ballast of claim 5, wherein said rectifier circuit further
2 includes a capacitor for reducing a crest factor of the discharge lamp.

1 7. A dimmable discharge lighting apparatus comprising:
2 the electronic ballast of claim 1; and
3 said discharge lamp, wherein
4 said apparatus is for providing a dimmable light when connected to a
5 dimming circuit for providing the input voltage.

1 8. An electronic ballast comprising:
2 an input rectifier circuit for rectifying an input voltage;
3 a voltage inverter circuit for receiving a rectified input voltage from said
4 input rectifier circuit, and for providing voltage/current to a
5 discharge lamp for providing a dimmable light;
6 a controller for controlling the operation of the voltage inverter circuit;
7 and
8 a constant voltage supply circuit for supplying a substantially constant
9 voltage to said controller, wherein
10 said constant voltage supply circuit provides said substantially constant
11 voltage both at low input currents and at high input currents.

1 9. The ballast of claim 8, wherein said constant voltage supply
2 circuit uses a voltage of the discharge lamp to generate said substantially
3 constant voltage during the low input currents, and further wherein said
4 constant voltage supply circuit uses said voltage pulses of said inverter circuit

5 to generate said substantially constant voltage during the high input currents.

1 10. The ballast of claim 8, wherein said input voltage is from a
2 dimming circuit, and wherein said constant voltage supply circuit includes:
3 a first capacitor connected to said inverter circuit for generating a first
4 current based on the voltage of said inverter circuit during a low
5 dimming operation of the dimming circuit; and
6 a second capacitor connected to the discharge lamp for generating a
7 second current based on the voltage of said discharge lamp
8 during a high dimming operation of the dimming circuit, wherein
9 said constant voltage supply circuit sums said first current and said
10 second current to generate said substantially constant voltage.

1 11. The ballast of claim 10, wherein said constant voltage supply
2 circuit further includes a plurality of diodes for rectifying said first current and
3 said second current.

1 12. The ballast of claim 8 further comprising a keep-alive feedback
2 circuit for feeding back energy from said discharge lamp to said voltage
3 inverter circuit to allow a high dimming operation of said apparatus.

1 13. A dimmable discharge lighting apparatus comprising:
2 the electronic ballast of claim 8; and
3 said discharge lamp, wherein
4 said apparatus is for providing said dimmable light when connected to
5 a dimming circuit for providing the input voltage.

1 14. An electronic ballast comprising:
2 an input rectifier circuit for rectifying an input voltage from a dimming
3 circuit;
4 a voltage inverter circuit having solid-state switches for receiving a
5 rectified input voltage from said input rectifier circuit, and for

6 providing voltage/currents to a discharge lamp for providing a
7 dimmable light;
8 a controller for controlling the operation of the voltage inverter circuit;
9 a keep-alive feedback circuit for feeding back energy from said
10 discharge lamp to said voltage inverter circuit to allow a high
11 dimming operation; and
12 a constant voltage supply circuit for supplying a substantially constant
13 voltage to said controller, wherein said constant voltage supply
14 circuit uses a voltage of the discharge lamp to generate said
15 substantially constant voltage during a high dimming operation
16 of the dimming circuit, and further wherein said constant voltage
17 supply circuit uses said voltage/current of said inverter circuit to
18 generate said substantially constant voltage during a low
19 dimming operation of the dimming circuit.

1 15. The ballast of claim 14, wherein said input rectifier includes:
2 a plurality of rectifier diodes operating at a frequency above the
3 frequency of the input voltage, wherein at any given time at least
4 one diode is in a conducting mode due to said keep-alive
5 feedback circuit; and
6 a capacitor for reducing a crest factor of the discharge lamp

1 16. The ballast of claim 15, wherein said constant voltage supply
2 circuit includes:
3 a first capacitor connected to said inverter circuit for generating a first
4 current based on a voltage of said inverter circuit; and
5 a second capacitor connected to the discharge lamp for generating a
6 second current based on a voltage of said discharge lamp,
7 wherein
8 said constant voltage supply circuit sums the first current and the
9 second current to generate said substantially constant voltage.

1 17. The ballast of claim 16, wherein said keep-alive feedback circuit
2 utilizes a capacitor for said feeding back energy.

1 18. A dimmable discharge lighting apparatus comprising:
2 the electronic ballast of claim 17; and
3 said discharge lamp, wherein
4 said apparatus is for providing a dimmable light when connected to the
5 dimming circuit having a phase dimmer.

1 19. A dimmable discharge lighting apparatus comprising:
2 the electronic ballast of claim 14; and
3 said discharge lamp, wherein
4 said apparatus is for providing a dimmable light when connected to the
5 dimming circuit having a phase dimmer.

1 20. The ballast of claim 14, wherein said constant voltage supply
2 circuit includes:
3 a first capacitor for generating a first current based on a voltage of the
4 discharge lamp; and
5 a second capacitor for generating a second current based on a voltage
6 output by said inverter circuit, wherein
7 said constant voltage supply circuit sums the first current and the
8 second current to generate said substantially constant voltage.